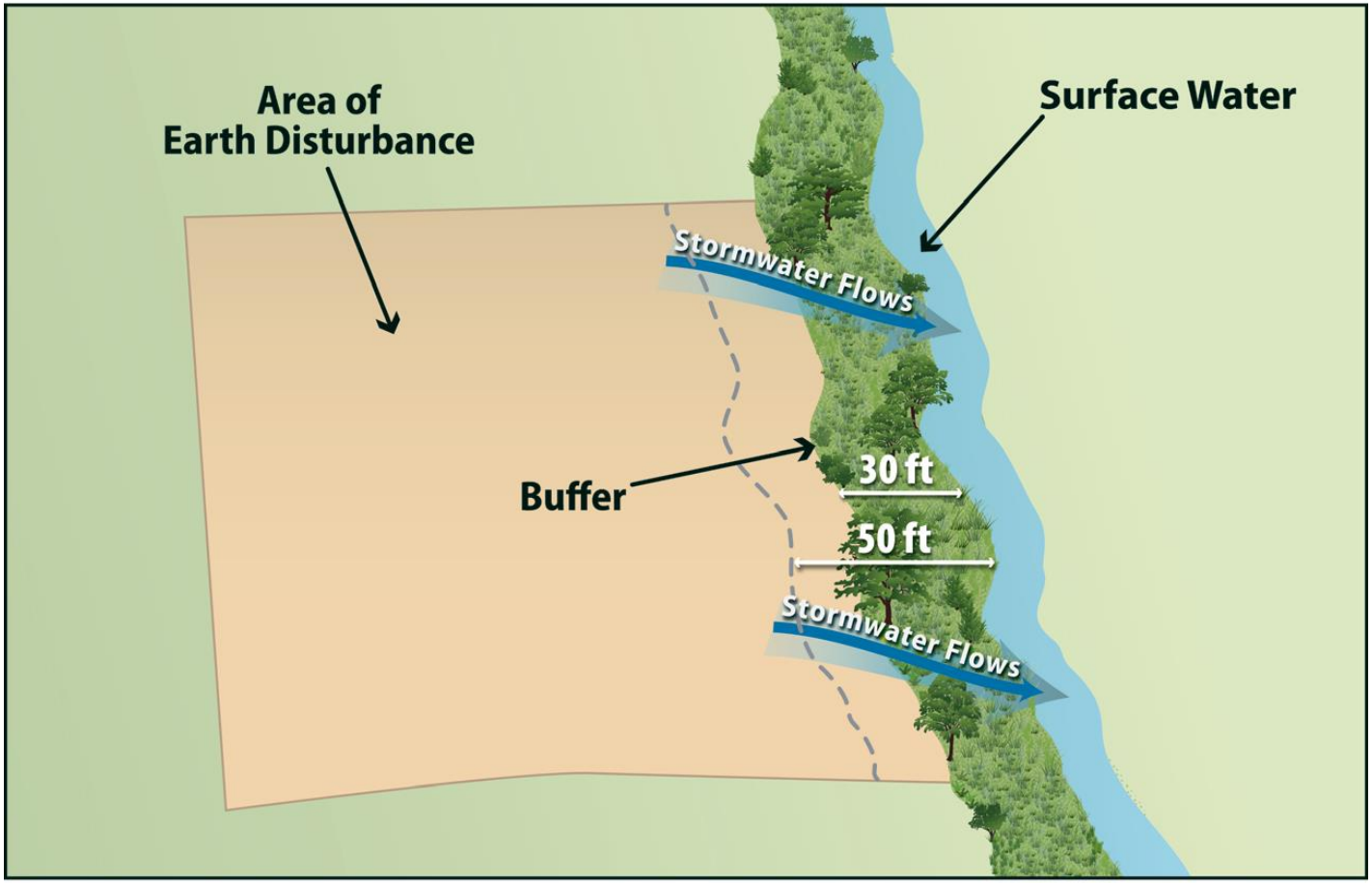
Natural Buffer

Define “Natural Buffer”

“Natural Buffer” – for the purposes of this permit, an area of undisturbed natural cover surrounding surface waters within which construction activities are restricted. Natural cover includes the vegetation, exposed rock, or barren ground that exists prior to commencement of earth-disturbing activities. (appendix A)

--“Not required to enhance the quality of the vegetation that already exists within the buffer.” (G.2.3)

Graphic of a natural buffer area



Three Compliance Alternatives

1. Provide and maintain a 50ft undisturbed natural buffer.
2. Provide and maintain less than 50ft of buffer and additional controls to equal a 50ft natural buffer.
3. Maintain no natural buffer, implement controls to equal a natural 50ft natural buffer.

Exemptions

- NO stormwater discharge
- Preexisting development disturbances
- Linear Project
- 404 permit

NO stormwater discharge

- Includes controls like berms or barriers

Preexisting development disturbances

- No natural buffer because of prior development, NOT required to comply. (e.g. road right next to river, bridge, etc.)

- Some natural buffer with development, ARE required to comply, but not expected to compensate for reduced buffer outside of your control. (page G-3)

Linear Project

- Not required to comply if site constraints (e.g. limited right-of-way) make infeasible.
- To extent practicable, limit disturbances within 50ft and provide additional controls.
- Document in SWPPP rationale and buffer width retained.

404 permits

- Disturbance exempted if “construction approved under a CWA Section 404 permit.”

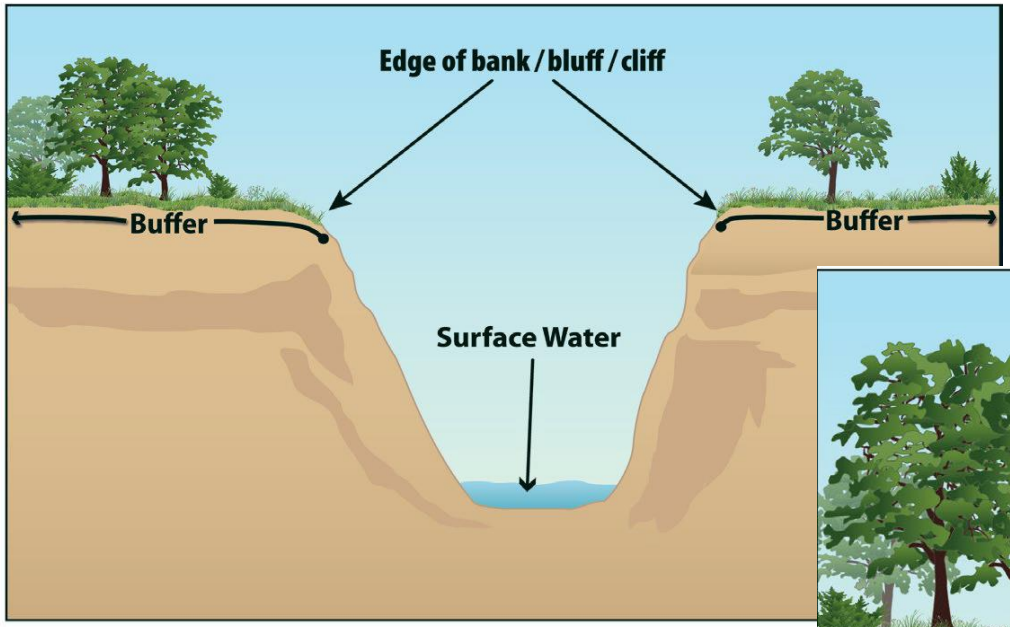
- Only 404 impact areas exempted

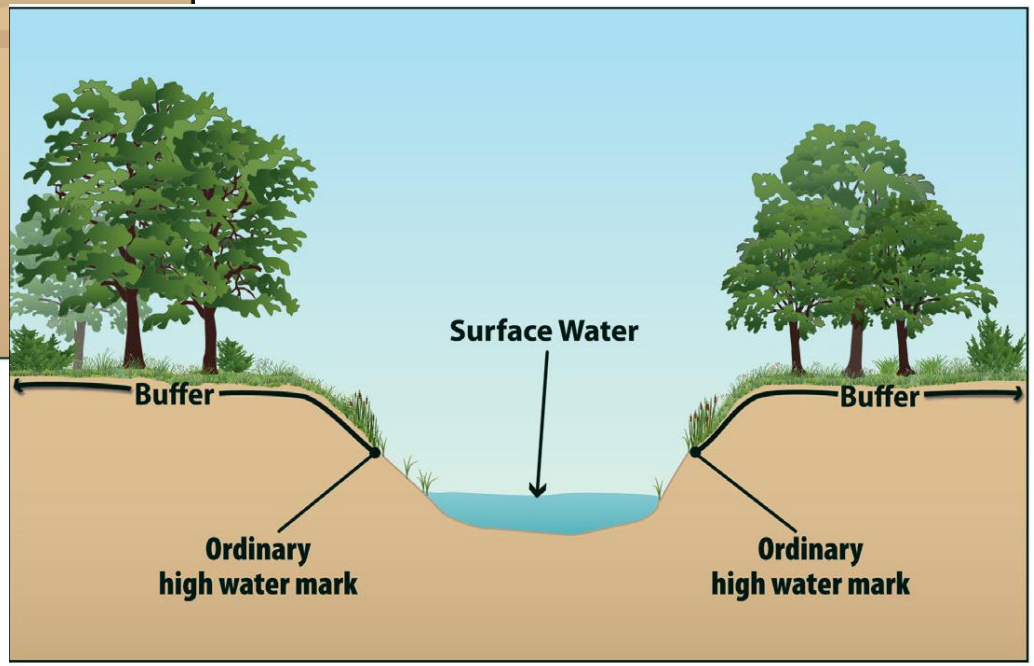
NOTE

- Only use table G-8
- Tables G-1 – G-7 DO NOT apply to ITD projects.
- Tables G-9 – G-15 DO NOT apply to IDAHO

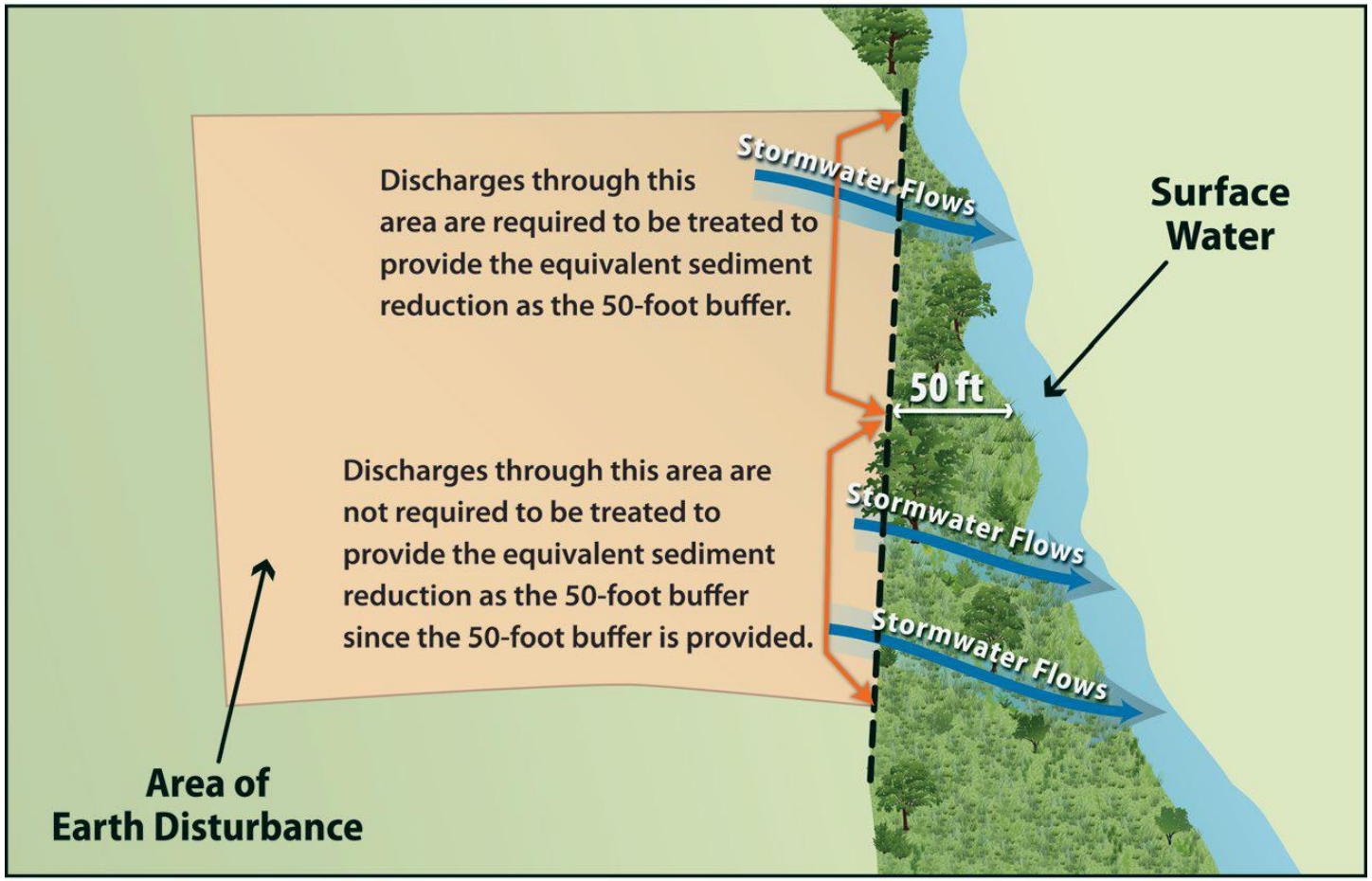
How to determine buffer width

- Select regular intervals along water's edge

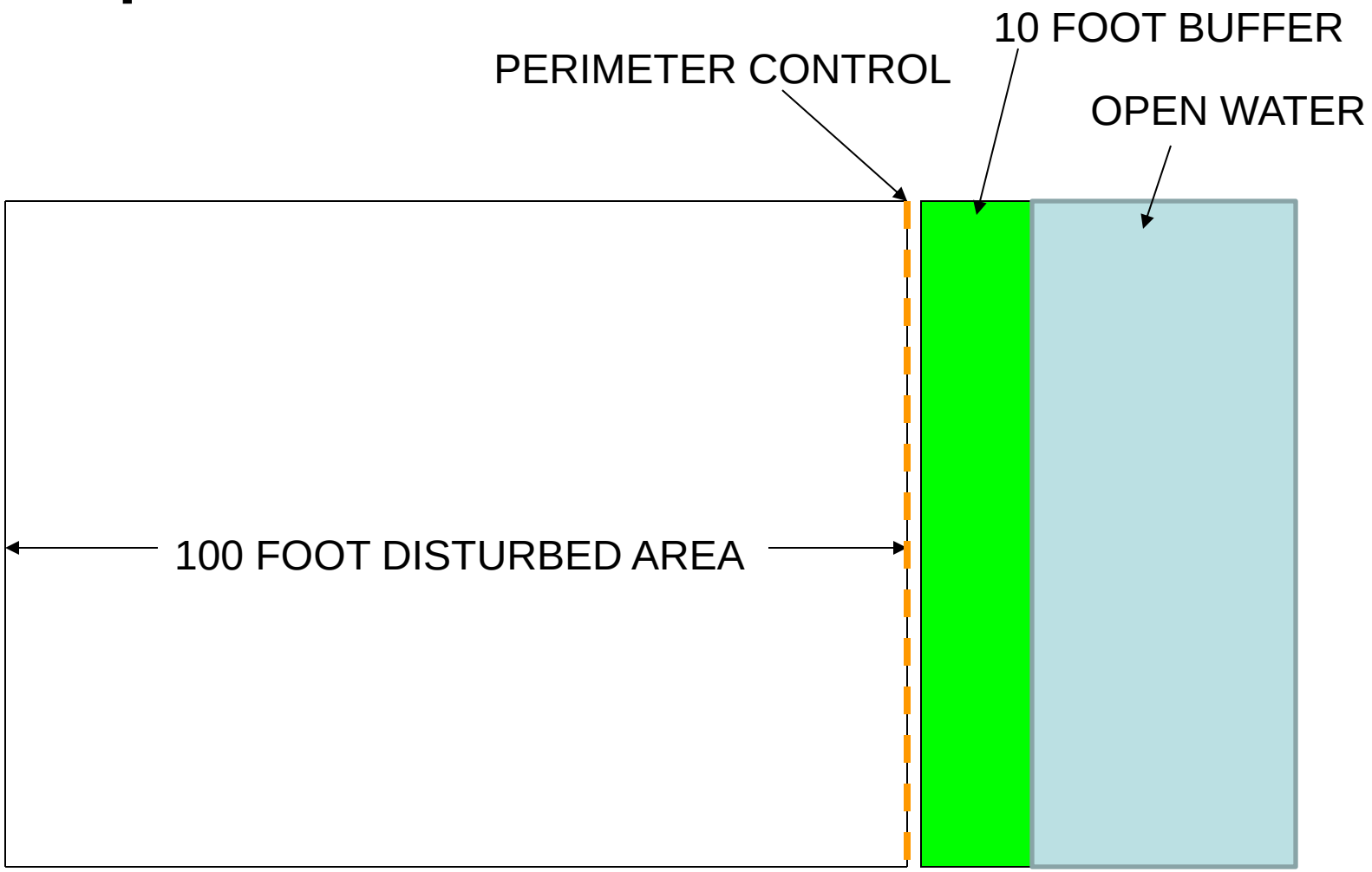




Buffer width may vary…



Example Scenario



Steps

- Step 1. Find the soil loss from a 100 foot disturbed area. (use RUSLE equation).
- Step 2. Subtract the removal efficiency of a 50 foot natural buffer.
- Step 3. Determine efficiency of the maintained natural buffer (10ft).
- Step 4. Add efficiency of BMP.
- Step 5. Compare 50ft efficiency with 10ft + BMP.

RUSLE

RUSLE equation is shown below.

A = **R** x **K** x **L S** x **C** x **P**

A = Annual soil loss in tons/acre/year

R = Rainfall factor

K = Soil erodability factor

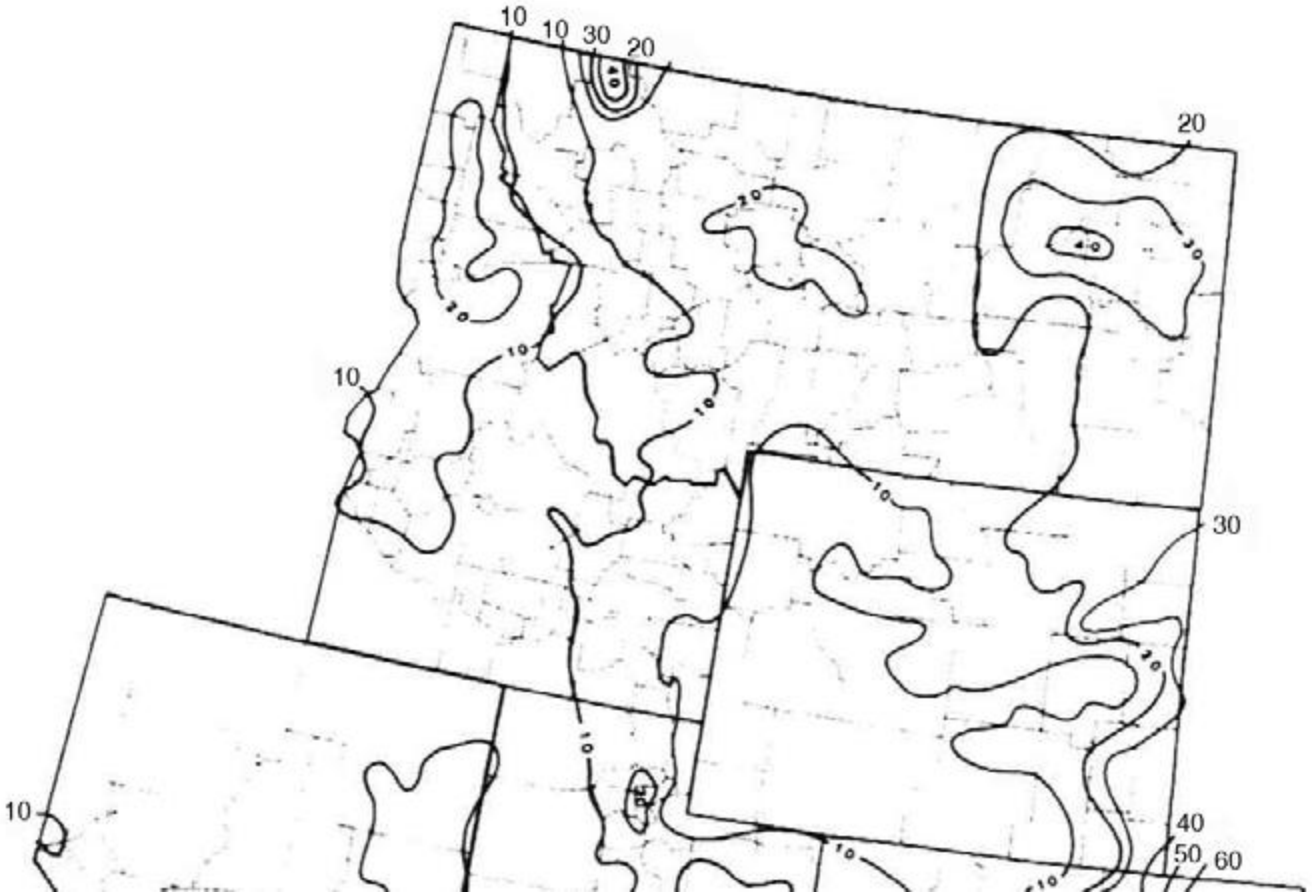
LS = Topographic Factor

C = Cover Factor

P = Management Factor

R – Rainfall Factor

Use a Isoerodent Map of Western U.S. (USDA)



K – Soil Erodability Factor

Web Soil Survey

http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm

USDA United States Department of Agriculture
Natural Resources Conservation Service

Web Soil Survey

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A A A

Area of Interest (AOI) | Soil Map | Soil Data Explorer | Shopping Cart (Free)

Search

Area of Interest

Open All | Close All

AOI Properties

Clear AOI

AOI Information

Name

Map Unit Symbols

- (•) Use Soil Survey Area Map Unit Symbols
- ( ) Use National Map Unit Symbols

Area (acres) 12.5

Soil Data Available from Web Soil Survey

Ada County Area, Idaho (ID666)

Spatial Data	Version 3, Dec 12, 2005
Tabular Data	Version 5, Jan 31, 2008

Clear AOI

Import AOI

Export AOI

Quick Navigation

Legend

Area of Interest Interactive Map

View Extent: Contiguous U.S. | Scale: (not to scale)

Search

Map Unit Legend

Ada County Area, Idaho (ID666)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
136	Power-McCain silt loams, 8 to 12 percent slopes	8.2	65.6%
158	Rock outcrop-Trevino complex, 5 to 20 percent slopes	1.7	13.4%
164	Scism silt loam, bedrock substratum, 2 to 4 percent slopes	2.6	21.0%
Totals for Area of Interest		**12.5**	**100.0%**

Legend

Soil Map

Scale (not to scale)

Warning: Soil Map may not be valid at this scale.

United States Department of Agriculture
Natural Resources Conservation Service

Web Soil Survey

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A A A

Area of Interest (AOI) | Soil Map | **Soil Data Explorer** | Shopping Cart (Free)

View Soil Information By Use: All Uses

Printable Version | Add to Shopping Cart

Intro to Soils | Suitabilities and Limitations for Use | **Soil Properties and Qualities** | Ecological Site Assessment | Soil Reports

Search

Properties and Qualities Ratings

Open All | Close All

- Soil Chemical Properties
- **Soil Erosion Factors**
  - K Factor, Rock Free
  - **K Factor, Whole Soil**
    - View Description | View Rating
    - **View Options**
    - **Advanced Options**
    - View Description | View Rating
  - T Factor
  - Wind Erodibility Group
  - Wind Erodibility Index
- Soil Physical Properties
- Soil Qualities and Features
- Water Features

Legend

Map — K Factor, Whole Soil

Scale (not to scale)

Warning: Soil Ratings Map may not be valid at this scale.

Tables — K Factor, Whole Soil — Summary By Map Unit

Summary by Map Unit — Ada County Area, Idaho (ID666)

K Factor, Rock Free

K Factor, Whole Soil

View Description | View Rating

View Options

Advanced Options

View Description | View Rating

T Factor

Wind Erodibility Group

Wind Erodibility Index

Soil Physical Properties

Soil Qualities and Features

Water Features

Warning: Soil Ratings Map may not be valid at this scale.

Tables — K Factor, Whole Soil — Summary By Map Unit

Summary by Map Unit — Ada County Area, Idaho (ID666)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
136	Power-McCain silt loams, 8 to 12 percent slopes	.43	8.2	65.6%
158	Rock outcrop-Trevino complex, 5 to 20 percent slopes		1.7	13.4%
164	Scism silt loam, bedrock substratum, 2 to 4 percent slopes	.43	2.6	21.0%
Totals for Area of Interest			**12.5**	**100.0%**

Description — K Factor, Whole Soil

Rating Options — K Factor, Whole Soil

LS – Topographic Factor

- Use USDA Charts http://www.iwr.msu.edu/rusle/lsfactor.htm

- Must know the slope length and %slope

Example:

- Slope Length = 100 feet
- Slope = 6%

Table 4-11. LS Values for Freshly Prepared Construction and other Highly Disturbed Soil, with Little, or no Cover

	Slope length in feet																
Slope	<3	6	9	12	15	25	50	75	100	150	200	250	300	400	600	800	1000
%																	
0.2	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.06	0.06	0.06	0.06	0.06	0.06
0.5	0.07	0.07	0.07	0.07	0.07	0.07	0.08	0.08	0.09	0.09	0.10	0.10	0.10	0.11	0.12	0.12	0.13
1.0	0.09	0.09	0.09	0.09	0.09	0.10	0.13	0.14	0.15	0.17	0.18	0.19	0.20	0.22	0.24	0.26	0.27
2.0	0.13	0.13	0.13	0.13	0.13	0.16	0.21	0.25	0.28	0.33	0.37	0.40	0.43	0.48	0.56	0.63	0.69
3.0	0.17	0.17	0.17	0.17	0.17	0.21	0.30	0.36	0.41	0.50	0.57	0.64	0.69	0.80	0.96	1.10	1.23
4.0	0.20	0.20	0.20	0.20	0.20	0.26	0.38	0.47	0.55	0.68	0.79	0.89	0.98	1.14	1.42	1.65	1.86
5.0	0.23	0.23	0.23	0.23	0.23	0.31	0.46	0.58	0.68	0.86	1.02	1.16	1.28	1.51	1.91	2.25	2.55
6.0	0.26	0.26	0.26	0.26	0.26	0.36	0.54	0.69	0.82	1.05	1.25	1.43	1.60	1.90	2.43	2.89	3.30
8.0	0.32	0.32	0.32	0.32	0.32	0.45	0.70	0.91	1.10	1.43	1.72	1.99	2.24	2.70	3.52	4.24	4.91
10.0	0.35	0.37	0.38	0.39	0.40	0.57	0.91	1.20	1.46	1.92	2.34	2.72	3.09	3.75	4.95	6.03	7.02
12.0	0.36	0.41	0.45	0.47	0.49	0.71	1.15	1.54	1.88	2.51	3.07	3.60	4.09	5.01	6.67	8.17	9.57
14.0	0.38	0.45	0.51	0.55	0.58	0.85	1.40	1.87	2.31	3.09	3.81	4.48	5.11	6.30	8.45	10.40	12.23
16.0	0.39	0.49	0.56	0.62	0.67	0.98	1.64	2.21	2.73	3.68	4.56	5.37	6.15	7.60	10.26	12.69	14.96
20.0	0.41	0.56	0.67	0.76	0.84	1.24	2.10	2.86	3.57	4.85	6.04	7.16	8.23	10.24	13.94	17.35	20.57
25.0	0.45	0.64	0.80	0.93	1.04	1.56	2.67	3.67	4.59	6.30	7.88	9.38	10.81	13.53	18.57	23.24	27.66
30.0	0.48	0.72	0.91	1.08	1.24	1.86	3.22	4.44	5.58	7.70	9.67	11.55	13.35	16.77	23.14	29.07	34.71
40.0	0.53	0.85	1.13	1.37	1.59	2.41	4.24	5.89	7.44	10.35	13.07	15.67	18.17	22.95	31.89	40.29	48.29
50.0	0.58	0.97	1.31	1.62	1.91	2.91	5.16	7.20	9.13	12.75	16.16	19.42	22.57	28.60	39.95	50.63	60.84
60.0	0.63	1.07	1.47	1.84	2.19	3.36	5.97	8.37	10.63	14.89	18.92	22.78	26.51	33.67	47.18	59.93	72.15

C – Cover Factor

C = 1.0 for bare soil

C = Less than 1 for sites with vegetative coverage. Lower number for better (heavier) coverage

P – Management Factor

Use 1.0 for bare soil construction site

P = Less than one with practices (sediment pond, terracing slopes, diversion ditches)

- **R** = 10 (Isoerodent Map)
- **K** = 0.43 (Web Soil Survey)
- **LS** = 0.82
- **C** = 1.0
- **P** = 1.0

A = 10 x 0.43 x 0.82 x 1 x 1 = 3.526

A = 3.526 tons/acre/year

Table G - 8. Estimated 50-foot Buffer Performance in Idaho*

	Estimated % Sediment Removal				
Type of Buffer Vegetation**	Clay	Silty Clay Loam or Clay-Loam	Sand	Sandy Clay Loam, Loamy Sand or Silty Clay	Loam, Silt, Sandy Loam or Silt Loam
Tall Fescue Grass	42	52	44	48	85
Medium-density Weeds	28	30	28	26	60
Low-density Warm-season Native Bunchgrass (i.e., Grama Grass)	25	26	24	24	55
Northern Mixed Prairie Grass	28	30	28	26	50
Northern Range Cold Desert Shrubs	28	28	24	26	50

* Applicable for sites with less than nine percent slope
** Characterization focuses on the under-story vegetation

- From Web Soil Survey – Silt Loams
- From Site Visit – Medium-density Weeds

http://itd.idaho.gov/manuals/Online_Manuals/Current_Manuals/Roadside_ReVeg/fullVegetationManual.pdf

- Foot note 5: “The buffer performances were calculated based on a denuded slope upgradient of a 50-foot buffer and a perimeter controls, as perimeter controls are a standard requirement (see Part 2.1.2.2).”

Subtract the removal efficiency for 50 foot natural buffer w/ perimeter controls

2012 CGP Table G-8

60% removal Efficiency

3.526 x (1-0.60) = 1.41 tons/acre/year (Sediment Load)

This is the number on which we will base our equivalency calculations.

Removal Efficiency of 10’ Natural Buffer

Option 1: use a model

“There are a variety of models available that can be used to support your calculation, including USDA’s RUSLE-series programs and the WEPP erosion model, SEDCAD, SEDIMOT, or other models.” – 2012 CGP

http://fargo.nserl.purdue.edu/rusle2_dataweb/RUSLE2_Index.htm

Option 2: use some percentage of the 50 foot efficiency reported by EPA.

60% / 50 ft = x% / 10ft,

x = 12% removal efficiency (assuming equal removal throughout buffer)

Find removal efficiency of BMP

*Have a referenced source for removal efficiency of any BMP

Rice Straw Waddle -- 58% (http://www.earth-savers.com/)

3.526 x (1-0.58) = 1.48 tons/acre/year

Total removal efficiency of 10’ buffer and BMP

- 58% Waddle
- 12% 10ft buffer
- Total removal 70%
- 3.526*(1-.70) = 1.06 tons/acre/year

1.06 < 1.41, therefore in compliance

In the end..

- “You are considered to be in compliance with this requirement if you retain and protect from construction activities the natural buffer that existed prior to the commencement of construction.” (G.2.3)